carefully studied. In general, it may be said that the authors hold that fermentation of lactose broth, or lactose bile, may be regarded as a sufficient working test for organisms of intestinal origin. If this idea is carried out it will greatly simplify the routine procedure in the examination of water. The work of the English bacteriologists is discussed at length, particularly that of Houston in London and Clemesha in India.

A new chapter has been added to the book on the bacteriological examination of shell-fish, and it includes the recommendation of the Committee on Standard Methods for the Bacteriological Examination of Shell-fish of the American Public Health Association. The appendix describes the preparation of culture media, and contains an excellent list of references.

GEORGE C. WHIPPLE

SPECIAL ARTICLES

THE CHESTNUT BARK DISEASE ON CHESTNUT FRUITS[1]

SINCE the chestnut bark disease has been so widely studied by the many investigators who have given attention to it within the last few years, numerous articles have been published calling attention to the various ways by which the infection is known definitely to be spread from place to place, as well as of some methods that have been assumed to contribute to its spread. The most prominent of those thus far mentioned have been due to the transportation of spores through the agencies of wind, rain, insects, birds, rodents, man, etc., or to the transportation of various fruiting and vegetative parts, or fragments of the fungus, by means of infected cordwood, poles, ties, bark, grafting scions, nursery stock, etc. So far as the writer knows, no one has called special attention to the danger of the disease being transmitted by means of infected chestnut fruits, yet infected nuts at times undoubtedly are capable of spreading the disease, as will be realized from what follows, which describes one case which has come to our notice.

[1] Published by permission of the Secretary of Agriculture.

In September, 1912, Professor R. Kent Beattie, Dr. T. C. Merrill and the writer found numerous nuts and burs, which had been lying on the ground in Lancaster county, Pennsylvania, for several months, upon which were many reddish brown pustules, in a buff or yellowish mycelium. These looked very much like the pycnidial pustules and mycelium of *Endothia parasitica*. Portions of the diseased fruits were inoculated by the writer into the bark of a grafted Paragon chestnut tree, while for comparison some inoculations were made at the same time from a typical canker. The infected nuts were collected on September 4, 1912, and the infected bark was collected and the inoculations made on the following day. The records and results of these inoculations are given below.

The limb selected for inoculation was healthy-looking, apparently free from disease, from one to two inches in diameter, but on a tree that was already diseased on some other limbs. Eighteen cuts through the bark were made with a sterile knife-blade, except as noted below in the case of two cuts. For convenience in referring to these cuts they have been numbered consecutively from 1 to 18. Nos. 1, 2, 5, 6, 7, 8, 11, 12, 13, 14, 17 and 18 were checks, all uninoculated in the ordinary sense, though cuts 13 and 14 were made with the knife-blade after it had been used to cut some of the infected bark to be inserted in cuts 15 and 16.

Cuts 3 and 4 were inoculated with pieces of the mycelium-covered shell of the nut after the pustules had been cut away; cuts 9 and 10 were inoculated with pieces of the shell to which pustules were still attached; and cuts 15 and 16 were inoculated with pieces of bark from a disease lesion on the bark of an American chestnut tree.

On July 22, 1913 (about ten and one half months after the inoculations were made), the inoculations and checks were reexamined and records made of their condition. Cuts 1 and 2 were uninfected. Cut 3 likewise was uninfected. Cut 4 had developed a characteristic lesion about 4 inches long. Cut 5 was sur-

rounded by disease, apparently from two confluent lesions, one of which started about midway between cuts 4 and 5, but on the opposite side of the limb, while the other started near cut 5 and on the same side of the limb. Judging only from the size of these lesions, they must have originated soon after the inoculations were made. There was no evidence that any infection had started at cut 5. Cut 6 was uninfected. Cuts 7 and 8 showed sunken areas but no fans, pustules, nor other symptoms of the disease. Cut 9 had developed a girdling lesion 7 inches long with very many pustules. Cut 10 had developed a lesion 4½ inches long and 3 inches wide. Cuts 11, 12, 13 and 14 were uninfected. Cuts 15 and 16 had produced confluent girdling lesions aggregating 11 inches in length. This probably indicated that each cut had produced a lesion about 6 inches in length, as the cuts were about 5 inches apart. Cuts 17 and 18 were uninfected.

The results of these inoculations may briefly be summarized as follows:

2 inoculations from typical canker on bark, both successful.
2 inoculations from pustules on nut, both successful.
2 inoculations from mycelium on nut, one successful.
10 checks cut with sterile knife, none infected.
2 checks cut with contaminated knife, none infected.

These inoculations indicate that the disease was present on or in the nuts and burs collected. Although the latter were not used in the inoculations, the nuts and burs were covered with the same fungus, judging only from an examination with a hand lens; and, moreover, the nuts and burs were in contact when collected.

Perhaps nuts infected in this manner are not likely often to reach the market, and presumably would be unsalable either for seed purposes or for eating if they did reach it. In the latter case an additional source of danger would be created by discarding the diseased nuts, perhaps in a new locality far distant from the place where they were grown. In any event, the possibility of the disease at times being disseminated through great distances in this manner can not be overlooked in summing up the evidence bearing on this phase of investigation.

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Office of Investigation in Forest Pathology, Bureau of Plant Industry,
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October 20, 1913

Interglacial Mollusks from South Dakota

Mr. W. H. Over, of the University of South Dakota Museum, recently submitted for study a most interesting collection of interglacial mollusks. The material, consisting of wood, cones, shells, etc., in muck, were found in a well 20 feet below the surface, two or three miles north of Grandview, in Douglas County, South Dakota.

Professor James E. Todd thus refers to this material:[1]

An Ancient Tamarack Swamp.—Near Grandview, in the southeast quarter of sec. 33, T. 100, R. 64, were found traces of more recent occupation of the region by trees. In a well which had been dug on the edge of a basin near a branch of Andes Creek at the depth of 20 feet was found a layer of muck several inches in thickness, in which were pieces of wood with numerous fresh-water shells of nearly a dozen species. But the most remarkable thing was the stem of a hemlock or tamarack about 10 inches in diameter lying across the well, and in the muck were numerous cones evidently of the same species. Overlying this trace of a tamarack swamp was mud of various colors and consistency, evidently washed from the surrounding hillsides. That it should be so deeply buried was chiefly explained by its connection with the channel of Andes Creek. This was conclusive evidence that the region had been occupied more or less by timber since the ice had covered the region, possibly while the second moraine was in process of formation. Similar finds are reported from wells several miles west of that place.

The overlying till here is Wisconsin, which varies greatly in thickness. The surface is yellow clay underlain by blue clay. The

[1] Bull. 158, U. S. Geol. Survey, p. 121, 1899.